PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech Mid Semester Exam

Semester: IV

Subject Code: (303113255)

Subject Name: (Basics of Signals and Systems)

Date: (31/01/2024)

Time: (1hr: 30min)

Total Marks: 40

Sr. No.		Marks

Q.1   (A)   05

(1) Which signal is non-causal from the given signals?
   (a) x(t)=0; t<0
   (b) x(t)=0; t>0
   (c) x(n)=0; n<0
   (d) x(t)=1; t>0

(2) Define causal and non-causal system.

(3) Signal x(t) is odd signal if
   (a) x(t) = -x(t)   (b) x(t) = - x(-t)
   (c) x(t+T)   (d) x(t-T)

(4) Define lumped parameter system.

(5) Define distributed parameter system.

(B) Prove that any arbitrary discrete time signal can be described as the sum of shifted and scaled impulse response.   05

Q.2   Attempt any four (Short Questions)   12

   (1) Explain the classification of signals.
   (2) Explain the classification of systems.
   (3) Draw the following continuous time signals.
       a) Sinc Signal
       b) Step signal
       c) Ramp signal
   (4) Determine whether the following system is (i) memoryless (ii) causal and (iii) linear

$$y(t) = 10\,x(t) + 5$$

   (5) Determine whether the following system is (i) memoryless (ii) causal and (iii) linear

$$y(n) = |\,x(n)|$$

Q.3   Attempt any two questions   08
      (1)Sketch the following signals:
          a) $r(t)u(2-t)$
          b) $u(n+2)-u(n-3)$
      (2)Determine whether or not each of the following signals is periodic? If the signal is
          periodic, find the fundamental time period.
          a) $e^{j6\pi n}$
          b) $12\cos(20n)$

      (3)Derive the expression for convolution sum.

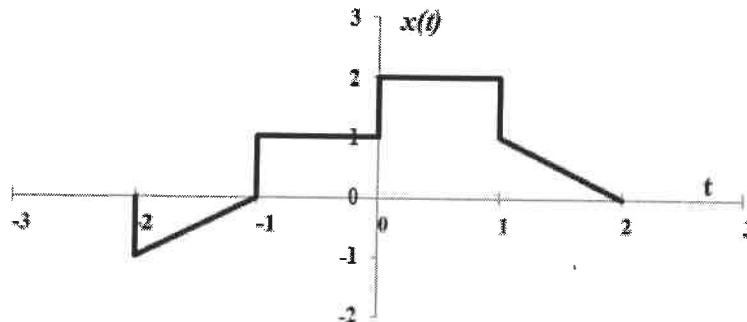Q.4   (A) Explain unit impulse signal with its properties.   05
      (B) A continuous time signal x(t) is shown in figure: Sketch and label carefully each of   05
      the following signals.
          a) $x\left(\frac{8-t}{2}\right)$
          b) $x(t)\left[\delta\left(t+\frac{3}{2}\right)-\delta\left(t-\frac{3}{2}\right)\right]$

                                        OR
      (B) Check whether the following signals are periodic or not? If they are periodic find the   05
      fundamental period. Justify your answers.
          1. $x(t)=2\sin(3t+1)+3\sin(4t-1)$
          2. $x(n)=e^{j7.351\pi n/20}$